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OPERABLE UNIT 4 PILOT PLANT PHASE II NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DOCUMENT NO. 451

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Department of Energy
Fernald Environmental Management Project
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Mr. Ken Alkema
Fernald Environmental Restoration
Management Corporation
P. O. Box 398704
Cincinnati, Ohio 45239-8704

Dear Mr. Alkema:

APPROVED CATEGORICAL EXCLUSION CX-451, JUNE 1994

The enclosed categorical exclusion (CX) under Subpart D of the Department of Energy's National Environmental Policy Act Procedures and Guidelines, 10 CFR 1021, effective May 26, 1992, has been approved by our office.

If you have any questions on this subject, please direct them to Ed Skintik at 648-3151.

Sincerely,

Ray Hamrac
for J. Phil Hamric
Manager

FN:Skintik

Enclosure: As Stated

cc w/enc:

K. Chaney, EM-423 TREV
R. Scott, EM-20 FORS
Administrative Record

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NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

CATEGORICAL EXCLUSION (CX) DETERMINATION
Operable Unit 4 Pilot Plant Phase II
NEPA Document No. 451
Fernald Environmental Management Project
Fernald, Ohio

Proposed Action

The United States Department of Energy (DOE) proposes to conduct Phase II of the Operable Unit 4 (OU4) Pilot Plant Project Treatability Study. This phase will demonstrate vitrification on a pilot plant scale using K-65 material from Silos 1 or 2 and material from Silo 3.

Location

The proposed action would take place in OU4's Silo 1 and 2, and Silo 3 and in a pilot-scale facility located approximately 200 feet east of Silo 3. The silos are located at the western perimeter of the Fernald Environmental Management Project (FEMP), south of the Waste Pit Area. The 1050 acre FEMP site is located approximately 29 km (18 miles) northwest of downtown Cincinnati, Ohio.

Background

Operable Unit 4 consists of Silos 1, 2, 3, and 4 contents and structures, the silos' ancillary structures, and the surrounding soils. Silos 1 and 2 are also known as the K-65 silos, which store radium-bearing residues that were formed as by-products of uranium ore processing. The radium-bearing residues in Silos 1 and 2 are a source of radon gas. Silo 3 contains metal oxide residues which consist of slurries of the uranium refinery operations that have been dried to a powdery material and then pneumatically conveyed into the silo. Silo 4 has remained unused.

A Remedial Investigation/Feasibility Study (RI/FS) for OU4 was conducted to gather information to support a decision regarding which methods should be employed to treat, stabilize, or isolate the silos' contents, structures, and affected areas to mitigate the potential threat to human health and the environment. In conjunction with the RI/FS, this treatability study is necessary to ensure that vitrification technology is evaluated in sufficient detail to support the Remedial Design/Remedial Action (RD/RA) for OU4. Operable Unit 4 treatability studies to date include assessment of vitrification technologies through the bench-scale stage. This pilot scale treatability study would provide performance and cost information needed to evaluate and select the final treatment alternatives as well as provide design information for full-scale treatment design.

NEPA documentation for Phase I of the OU4 Pilot Plant Project was approved on April 2, 1993. Phase I consists of construction and operation of a pilot-scale vitrification facility using a surrogate material (sand and bentonite) to ensure all unit operations safely function as designed before processing the K-65 (Silos 1 or 2) and Silo 3 material. Phase I consists of work to be completed in three

parts: 1) preparation for and execution of waste retrieval methods using Silo 4; 2) construction of the Pilot Plant; and 3) operation of the Pilot Plant using a surrogate material.

Description of Proposed Action

The proposed action involves Phase II of the two-phase vitrification Pilot Plant Project. Phase II would be pilot-scale testing, using K-65 and Silo 3 material in the vitrification facility constructed in Phase I. Silo 3 material would be mixed with K-65 material at a predetermined ratio, then vitrified. It is anticipated that adequate testing during Phase II would require approximately 20 metric tons (44,000 pounds) of K-65 material and 10 metric tons (22,000 pounds) of Silo 3 material. Testing operations would likely span a two to three month period. Phase II would include five major activities: 1) K-65 Silo Radon Treatment System (RTS) piping upgrade; 2) vitrification facility modification (if required); 3) K-65 material hydraulic retrieval; 4) Silo 3 material pneumatic retrieval; and 5) "hot" operation of the vitrification facility. These five activities are described in detail below.

1) **K-65 Silo RTS Upgrade:** The RTS would utilize dehumidification and carbon absorbers to reduce the radon in the silo dome void space during material retrieval operations. The RTS will be upgraded by replacing the valves and PVC pipe with new valves and stainless steel pipe. Withdrawn air from the silo undergoing retrieval operations would pass through the radon adsorption system. Following adsorption, the air would be returned to the silo.

2) **Vitrification Facility Modification:** The vitrification facility was designed for utilization of actual K-65 and Silo 3 material; therefore, no major modifications in Phase II are currently planned. However, after Phase I completion, minor modifications may be required.

3) **K-65 Silos Hydraulic Material Retrieval:** The silo contents would be removed with a mining device suspended from a mobile crane. This device would be deployed through an existing manway using a bag-in bag-out method to maintain the silo in a sealed condition. The hydraulic mining device would consist of a circumferential jetting ring, which would use high pressure water to dislodge and suspend the wastes, and a slurry pump to pump the slurried wastes from the silos to the vitrification facility. The removal rate from the silos is expected to be approximately 50 gallons/minute of slurry (15 to 20 percent solids). The mined silo material would be dewatered with a gravity thickener designed to increase the solids content. Grab samples would be taken and analyzed. The majority of the water removed in the dewatering process would be recycled for hydraulic mining and off-gas cooling at the vitrification facility, both in a closed loop process. Excess process water would be filtered prior to general site waste water treatment.

4) **Silo 3 Pneumatic Material Retrieval:** The Silo 3 contents would be removed using a dilute phase vacuum system. The vacuum system would be trailer mounted and include a surge bin to capture the Silo 3 material for

transport to the Pilot Plant. The vacuum nozzle would be manually operated through the perimeter manways as needed to remove the nominal 10 metric tons of material required for the treatability study.

5) "Hot" Operation of Vitrification Facility: Dewatered K-65 material would be transferred from the thickener to a slurry mix tank. Additives and Silo 3 material would also be added to the tank. After sampling and formula verification, the mixed solids would be fed directly into the vitrification furnace as a slurry (50-60 percent solids). Radon generated by the residues within the vitrification facility would be controlled by a once-through radon off-gas treatment system. All process tanks that would be in contact with raw residues would be closed-topped and operated at a negative pressure. Gases removed from those tanks would be vented to the radon off-gas treatment system and then discharged to the atmosphere. The primary objective of this activity would be to verify that the formulations developed from the OU4 bench-scale studies would produce a satisfactory glass product, based on its resistance to leaching and its physical properties. Secondarily, OU4 hopes to demonstrate vitrification furnace operation on a continuous basis of 1000 kg (2200 lb) of glass product per 24 hour period. Completion of Phase II would result in approximately 90 drums (55 gallon) of vitrified waste that would be temporarily stored on FEMP property (possibly Building 60) prior to off-property disposal.

Categorical Exclusion to be Applied

The authority for finding this project to be subject to NEPA Categorical Exclusion is contained in Subpart D of the revision to 10 C.F.R. 1021, entitled "National Environmental Policy Act Implementing Procedures and Guidelines." The Final Rule and Notice, effective May 26, 1992, includes a revised and expanded list of Categorical Exclusions that are classes of actions that normally do not require the preparation of either an Environmental Impact Statement or an Environmental Assessment.

The Final Rule and Notice specifically lists in Part 1021, Appendix B to Subpart D, Section 1021.410, B3.10 and B6.2, the following as types of actions that are Categorical Exclusions applicable to Specific Agency Actions:

B3.10 Small-scale research and development projects and small-scale pilot projects conducted (for generally less than two years) to verify a concept before demonstration actions, performed in an existing structure not requiring major modifications.

B6.2 The siting, construction, and operation of temporary (generally less than two years) pilot-scale waste collection and treatment facilities, and pilot-scale (generally less than one acre) waste stabilization and containment facilities (including siting, construction, and operation of a small-scale laboratory building or renovation of a room in an existing

building for sampling analysis) if the action: 1) supports remedial investigations/feasibility studies under CERCLA, or similar studies under RCRA, such as RCRA facility investigation/corrective measure studies, or other authorities and 2) would not unduly limit the choice of reasonable remedial alternatives (by permanently altering substantial site area or by committing large amounts of funds relative to the scope of the remedial alternatives).

These Categorical Exclusions are appropriate since the proposed action as described is Phase II of a treatability study in support of the OU4 RI/FS and provides critical information to aid remedial design. Phase II of the Pilot Plant Project is expected to last no longer than a year (less than four months for Phase II construction, if necessary, and approximately two to three months for operation) and cover less than one acre. Modifications to the existing facility from Phase I are expected to be minimal.

Phase II of the Pilot Plant Project is a waste treatment stabilization process which will augment the RI/FS studies and provide information in support of the OU4 RI/FS remedial design. In the event that Phase II proves that vitrification of the OU4 silo material is not technically achievable, the Pilot Plant facility could be converted for the cementation process alternative through utilization of the Pilot Plant building and equipment.

The proposed action would not violate applicable statutory, regulatory, or permit requirements; it would not require siting and construction nor major expansion of waste disposal, recovery or treatment facilities; nor would it have adverse impacts to any environmentally sensitive areas (e.g., wetlands, floodplains, or the sole-source aquifer).

Compliance Action

I have determined that the proposed action meets the requirements for the CX referenced. Therefore, the proposed action is categorically excluded from further NEPA review and documentation.

Approval: Ray Hansen
for J. Phil Hamric, Manager
U.S. Department of Energy, Fernald Field Office

Date: 6-24-94